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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,841	03/19/2004	Lawrence E. Gebhart	461987-024	7527

42101 7590 09/21/2007
THOMPSON HINE LLP
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EXAMINER

LEADER, WILLIAM T

ART UNIT	PAPER NUMBER
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1753

MAIL DATE	DELIVERY MODE
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09/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/804,841

Applicant(s)

GEBHART ET AL.

Examiner

William T. Leader

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-31 and 33-48 is/are pending in the application.
- 4a) Of the above claim(s) 1-11, 13-20 and 41-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-31, 33-40 and 44-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>attached</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. Receipt of the papers filed on July 9, 2007, is acknowledged. Claims 1-11, 13-31 and 33-48 are pending. Claims 1-11, 13-20 and 41-43 remain withdrawn from consideration.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. In view of the amendments to the claims, the rejections of record based on Bonkass et al (6,974,530) as the primary reference are withdrawn.

Claim Rejections - 35 USC § 103

4. Claims 21-26, 30, 31, 33-35 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Kempen et al (6,818,115) in view of the admitted prior art.
5. The van Kempen et al patent is directed to a system and method for electroplating workpieces, particularly circuit boards. See the abstract. The plating cell is illustrated in figures 1, 2A and 2B. As shown in the figures, the circuit boards being plated have a major surface. A plurality of eductors 22 is provided in the plating cell. The plating cell additionally includes floating shield 20. The shield includes partition 23. Electrolyte solution is flowed from an eductor over the surface of partition 23. The partition 23 is shaped to enhance the venturi effect of the eductors (column 2, lines 27-29). Van Kempen et al states that the invention provides improved flow of electrolyte through the holes of the printed circuit boards being plated. The

improved flow is accomplished by an increase in laminar flow along the printed circuit boards (column 1, lines 43-48). In particular, van Kempen et al discloses that the partition 23 assists in producing the improved laminar flow 26 along the printed circuit boards 21. As shown by the arrows in figures 2A and 2B, there is a flow of electrolyte along the surface of partition 23 which thus serves as a flow dampening member with a flow-directing surface.

6. The admitted prior art is that found in applicant's specification under the heading "Background of the Invention" and includes figures 2-9. Instant claim 21 recites a plating cell that contains an anode. Van Kempen et al does not specifically state that the plating cell includes an anode. However, in order for electroplating to take place, an anode counter-electrode must be present as shown, for example, in applicant's prior art figure 2 where anodes 112 oppose the major surface of workpiece 102.

7. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have provided an anode in the plating cell of van Kempen et al because it is conventional as shown by the admitted prior art. Van Kempen et al disclose plating on a circuit board as recited in instant claim 22. With respect to claim 23, van Kempen et al disclose that the plating can be further improved by using a vibrator (column 2, lines 65-67) Figure 1 shows vibrator 11. With respect to claims 24 and 25, van Kempen discloses a transport mechanism to move (oscillate) the circuit boards from side to side (column 2, lines 37-43). With respect to claim 26, van Kempen et al refers to electroplating in general and does not disclose a particular metal. The admitted prior art shows that it is known

to electroplate copper over board surfaces. See paragraph [0004]. This suggests the use of copper in the process of van Kempen et al for plating circuit boards.

8. Claims 30 and 31 recite particular workpiece dimensions. The apparatus suggested by van Kempen et al and the admitted prior art would have been capable of electroplating onto workpieces having a range of sizes. Claims 33-35 recite that the flow-directing surface is a curved or a flat member. As shown in figures 2A and 2B of van Kempen et al, partition 23 includes both a curved section and a flat section. Use of a curved or a flat surface is, therefore, suggested. With respect to claim 47, both van Kempen et al and the admitted prior art disclose processes where the major surface of the workpiece is oriented vertically and electrolyte flows vertically over the major surface of the workpiece.

9. Claims 27-29 and 38-40 rejected under 35 U.S.C. 103(a) as being unpatentable over van Kempen et al (6,818,115) in view of the admitted prior art as applied to claims 21-26, 30, 31, 33-35 and 47 above, and further in view of Botts et al (5,776,327).

10. Claim 38 additionally differs from van Kempen et al by reciting that the anode chamber contains a baffle while claims 39 and 40 recites that the anode chamber contains a non-conducting shield. The Botts patent is directed to a method for electroplating in which achieving a uniform plating thickness is desired (column 3, lines 46-52) and disclose an anode basket 10 with mask 20. The mask includes non-conductive frame 22 and non-conductive adjustable plates 32. See figure 2 and column 4, lines 7-29. The adjustable plates serve as a baffle and non-conducting shield. As shown in figure 4, the mask controls the electric field generated by the

anode. It would have been obvious to have included the mask assembly in the anode of the admitted prior art because improved plating uniformity would have been achieved as taught by van Kempen et al. Claims 27-29 recite specific anode-workpiece spacing. Anode-workpiece spacing is a result-effective variable which affects the distribution of the electric field. Choice of an appropriate spacing is a matter of routine optimization within the skill of the ordinary worker in the art who would have recognized the relationship between the anode-workpiece geometry and electric field as shown in figures 3 and 4 of Botts et al.

11. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Kempen et al (6,818,115) in view of the admitted prior art and Botts et al (5,776,327) as applied to claims 27-29 and 38-40 above, and further in view of the Lowenheim text *Electroplating*.

12. As indicated in the previous office action, Lowenheim teaches at page 153 that anodes may be placed in anode bags of finely woven material to hold back anode sludges. It would have been obvious to have utilized an anode bag in the process of van Kempen et al to have reduced the contamination of the electrolyte solution with anode sludge as taught by Lowenheim. The orientation of the anode in the admitted prior art is the same as that now recited in claim 37. The masked anode assembly of Botts et al would have served as a virtual anode.

13. Claims 44-46 and 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over van Kempen et al (6,818,115) in view of the admitted prior art as applied to claims 21-26, 30, 31, 33-35 and 47 above, and further in view of Wilson et al (2005/0178667).

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14. Claims 44-46 recite levels of uniformity of the metal deposit. As indicated in the previous office action, Wilson et al disclose the desirability of uniform plating. In paragraph [0073] Wilson et al teach reducing non-uniformity to less than five percent of the 3-sigma value. The desirability of providing a uniform deposit in the process of van Kempen et al would have been obvious at the time the invention was made in view of the high level of uniformity taught by Wilson et al.

15. Wilson et al shows in figure 1 and figure 3 electroplating apparatus in which electrolyte is introduced in a lower portion of the plating cell and exits from the top of the cell. See the arrow labeled "F" in figure 3. In van Kempen et al electrolyte is introduced into the lower portion of an electroplating container through the eductors and flows upward over the workpiece. Van Kempen is silent as to where the electrolyte exits. However, since the electrolyte is traveling from the bottom of the cell over the workpiece as in Wilson, it would have been obvious to have removed the electrolyte from the top of the cell as shown by Wilson in the process of van Kempen et al since any impurities would be removed from the cell prior to any additional contact with the workpieces.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



William Leader
September 13, 2007



SUSY TSANG-FOSTER
PRIMARY EXAMINER